

THE SENSORY NERVES OF THE MUSCLES.—Carl Sachs (*Reichert and Du-Bois Raymond's Archiv*, 1874, No. VI. p. 645-675), in a lengthy paper on this subject, offers the following general conclusions:

1. All objections that have been brought against the doctrine of the sensibility of the muscles, are easily overthrown on theoretic grounds.

2. Reflex contractions can be produced by irritation of the nerve trunk entering a muscle, or the muscle itself. This is evidence of the presence of sensory apparatus in the muscle.

3. The striped muscular fibre, even in an "enervated" state (by curare, analectrotonus, degeneration of the nerves), is still excitable by the induced electric current.

4. All motor nerve-fibres in the muscles of a frog's leg degenerate after section of the anterior roots of the sciatic nerve. A few fibres still remain intact, and degenerate after section of the posterior roots, although more slowly and less noticeably.

5. In the sartorius muscle, it is possible, by a peculiar cut, to show the separate action of the motor and sensory fibres. Irritation of the first causes local contractions; while of the latter, it is without effect.

6. With proper precautions, it is possible to irritate each nerve-fibre of a muscle by itself. We find fibres, irritation of which produces no contraction.

7. The intra-muscular fibres show, at tolerably regular intervals, the "annular strangulations" of Ranvier, the pre-existence of which was proved by their presence in fresh, physiologically active nerve-fibres.

8. The striped muscles of all vertebrates possess sensory fibres, which arise from a relatively small number of medullated fibres, by division. The secondary and tertiary branches, by their long isolated course, the ramificatory manner of their increase, are distinguished from the motor fibres which are always united in bundles and increase by division. They give out soft, non-medullated, nucleated fibrils, frequently anastomosing with each other, and terminating in infinitely fine branches: partly in the connective tissue envelopes of the muscles, partly in the interstitial tissue, and partly in the muscular fibre itself.

FUNCTION OF THE SEMICIRCULAR CANALS.—A. Bornhardt publishes in the *Obl. f. d. Med. Wissensch.*, No. 21, the following conclusions of experiments carried on by himself in Prof. Cyon's laboratory in St. Petersburg:

The principal object of a series of experiments on which I have long been engaged, was the solution of the question, whether the results of the division of the semicircular canals are to be considered as irritative or paralytic phenomena of the *nervi vestibuli*. It seems to me that a notable step in advance is afforded by my own observations, as follows:

1. I have experimentally demonstrated, that the motor phenomena following section of the canals, in the majority of cases, are due to the almost unavoidable accidents of the operation, and are not to be explained by any existing theory.

2. Experimental examination of the Breuer-Mach theory, shows its invalidity. If we take rabbits or doves after the semicircular canals have

been *carefully* divided, and fasten them on a wheel put in motion in a horizontal direction, we observe in these animals the same compensating motions of the head as are seen in others that are uninjured; i. e., in the animals operated upon as well as in those not so treated, the head always lags behind in the rotation, while when that ceases, it comes again to its normal position. Repetitions of the experiment always bring about the same result.

3. The movements of the head and eyes are also seen in animals operated upon, but weaker than in those that are still uninjured.

4. Certain anatomical data are opposed to Mach's view, and indicate that the contents of the canals are better suited for the conduction of undulations than of progressive movements.

5. Every muscular motion in moving the head must produce such undulations. I am, therefore, of the opinion, that the semicircular canals, through the conduction of the undulations caused by the muscular contraction, serve to produce the muscular sensation of activity in the muscles of the head.

6. The following experiment, often repeated by me, seems to support this view: If one lays bare the horizontal canal in a rabbit in such a way as not to injure its cartilaginous envelope, and then gently moves over it to and fro with the back of the knife so as to only shake up its contents, the same characteristic movements of the head and eyes take place as after its section.

7. That the direction of the muscles of the head is also (in doves) parallel to that of the canals, seems also to favor this view.

8. The same motor phenomena as after section of the canals have been produced by me by an operation, in which neither the brain nor the cartilaginous canals were involved. I applied to the vertical as well as the horizontal canals (of doves), the action of ether spray by means of an atomizer; or I simply touched a limited spot with a red hot needle, and in both cases the phenomena occurred. The same effect was produced by placing a vibrating tuning fork on the canal.

A more extended statement of the results of these investigations is promised.

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The following are the titles of some of the recent papers in this department:

QUINCKE, On Excitation of the Vagus in Man, *Berliner Klin. Wochenschr.*, No. 15, April 12; CUNNINGHAM, Notes on the Great Splanchnic Ganglion, *Jour. of Anat. and Phys.*, May, 1875; WINTERNITZ, The Importance of the Functions of the Skin to the Bodily Temperature and the Heat Regulation, *Stricker's Jahrb.*, 1875, p. 1; BREUER, Contribution to our Knowledge of the Organs of the Static Sense (The Vestibular Apparatus of the Ear), *Ibid.*, p. 87; NESTEROWSKY, The Nerves of the Liver, *Virchow's Archiv*, LXIII., 3 and 4, p. 363; JENDRASSIK, First Report on the Analysis of the Contraction Increase of the Striped Muscular Fibres, *Reichert and DuBois Reymond's Archiv*, 1873, No. 5, p. 513; FREY, The Vaso-motor Nerves of the Arm, *Ibid.*, p. 633; DEGIOVANNI, Facts Concerning the Contractibility of the Capillary Blood-Vessels, *Rivista Clinica*, April; HERMANN MUNK, On Partial Excitation of the Nerves, *Reichert and DuBois Reymond's Archiv*, 1875, p. 41; BABUCHIN, The Electric Organs in the Malapterurus, *Centralbl. f. d. med. Wissensch.*, No. 1.